

Red Palm Oil and Palm Carotenoids: Challenges and Opportunities

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Presentation Outline

1. The Red Palm Fruit Oil Story
2. Nutraceuticals from Red Palm Oil
3. Vertical Integration A Key To Sustainability
4. The Competitive Scenario
5. Red Palm Oil – The Nutritional Advantage
6. Natural Carotenoids – The Science Thus Far
7. Challenges in Marketing Red Palm Oil
8. Challenges in Marketing Palm Carotenoids
9. Opportunities
10. The Way Forward

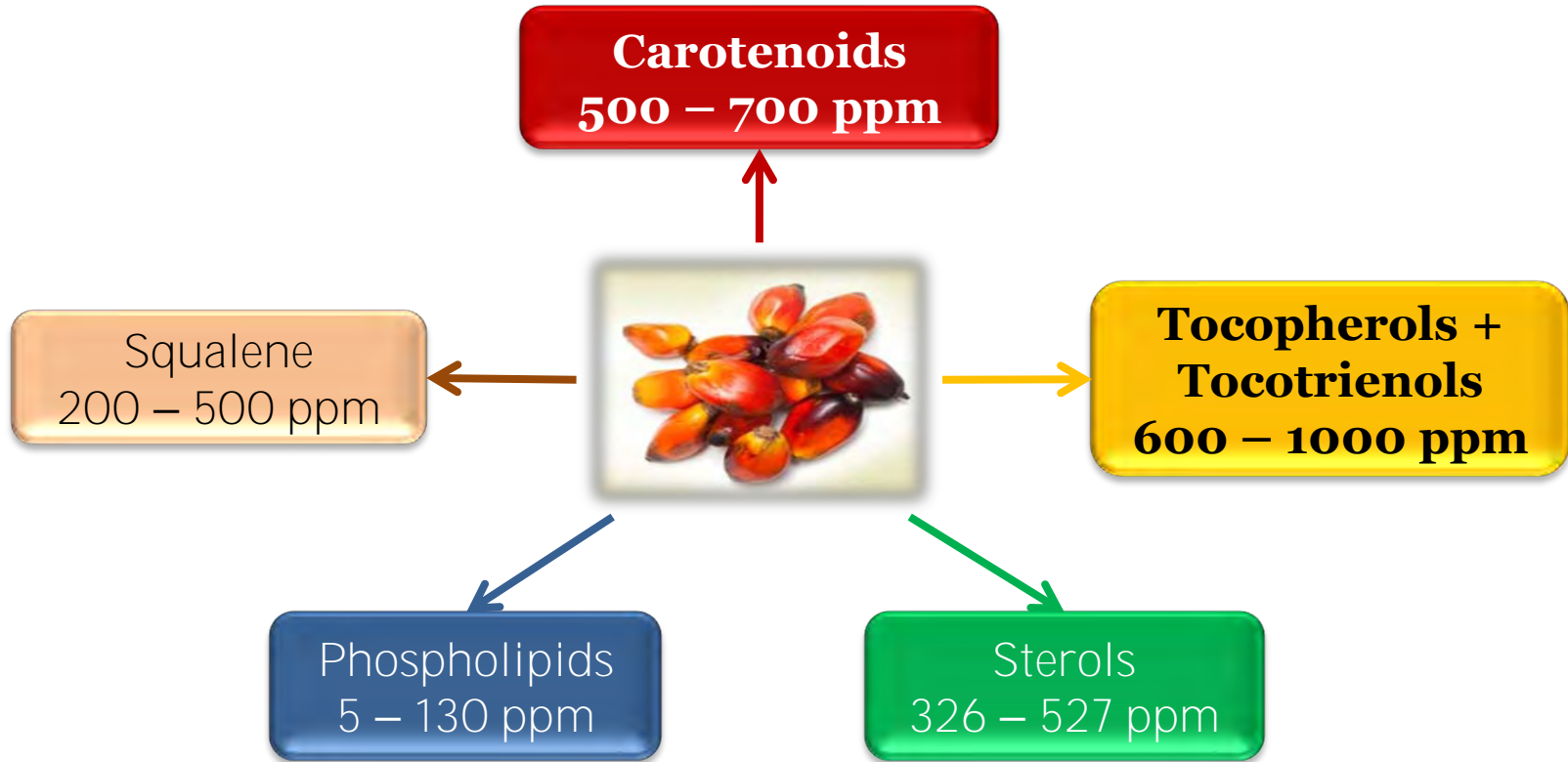
The Red Palm Fruit Oil Story



Palm Fruit Oil

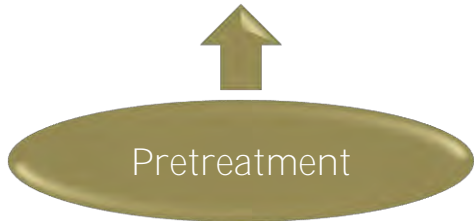
Palm Kernel Oil

Valuable Minor Components in Red Palm Fruit Oil

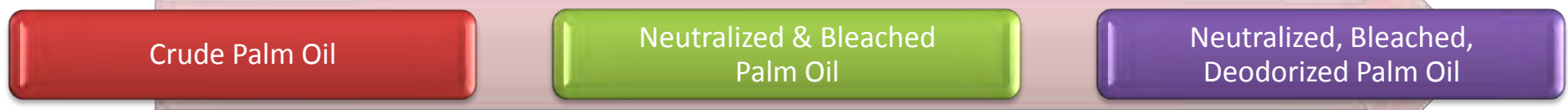


Physical & Chemical Refining Process

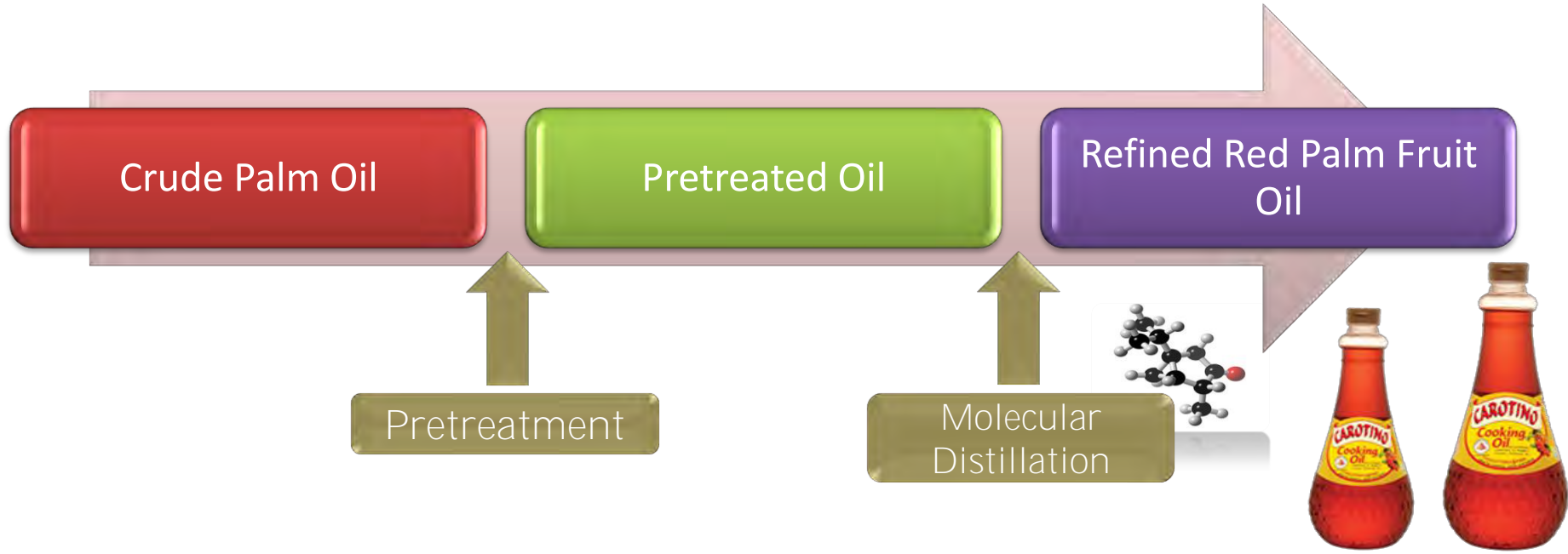
Physical Refining



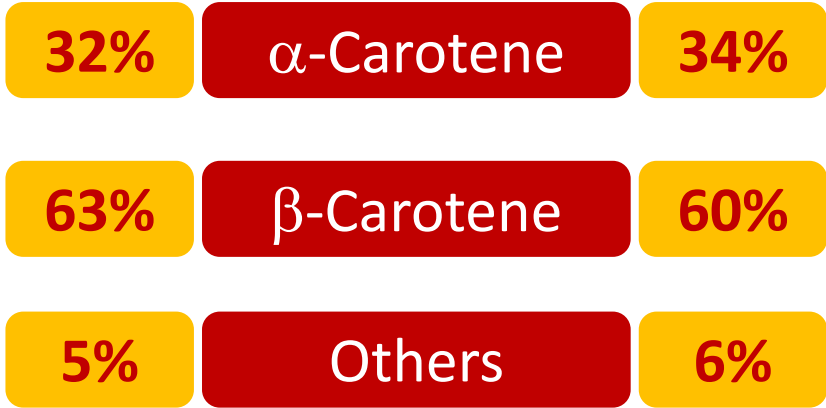
Chemical Refining



Patented Refined Red Palm Fruit Oil Technology



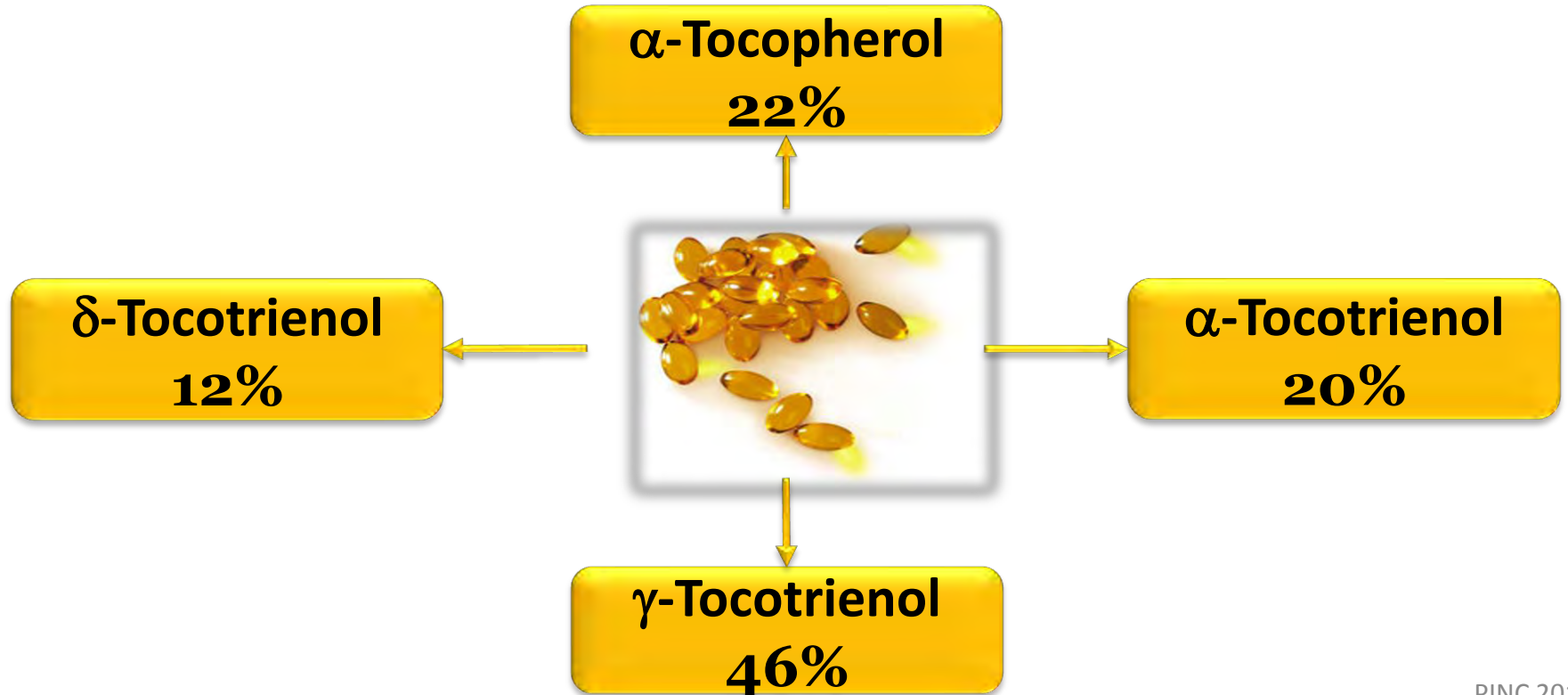
Distribution of Carotenes in Carrot & Palm Fruit Oil



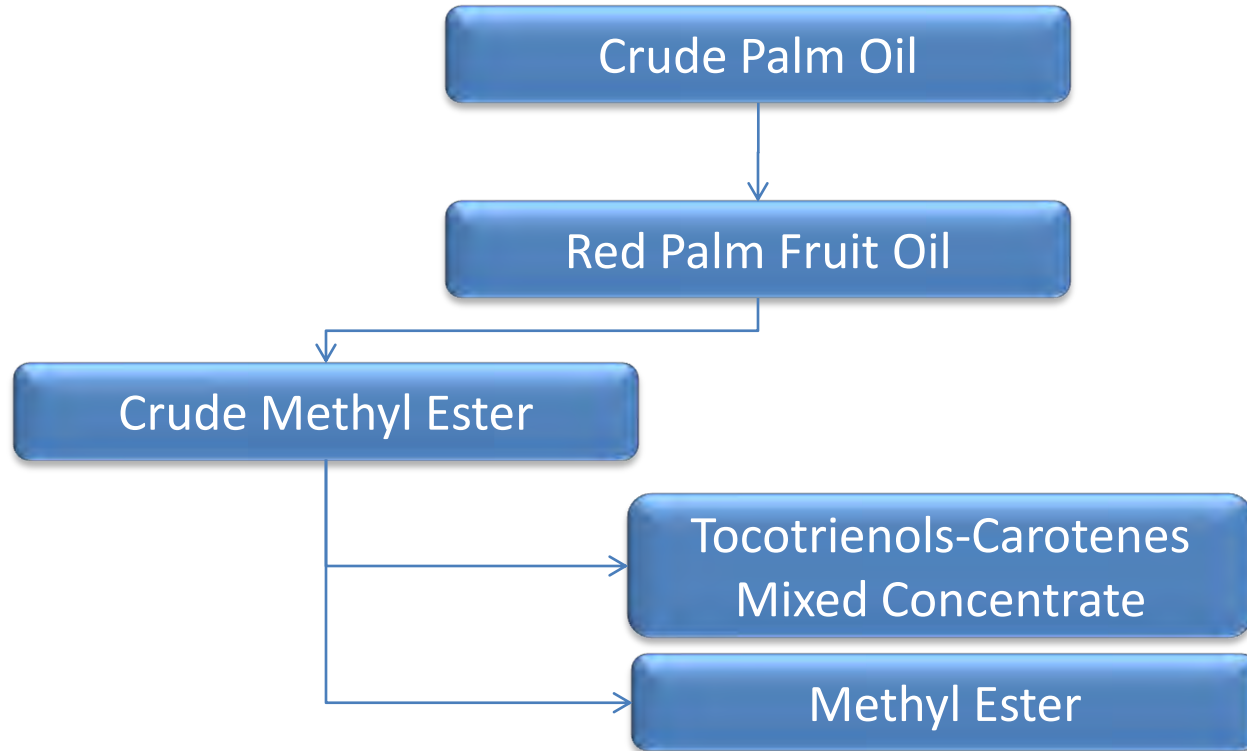
< 100 ppm

500 – 700 ppm

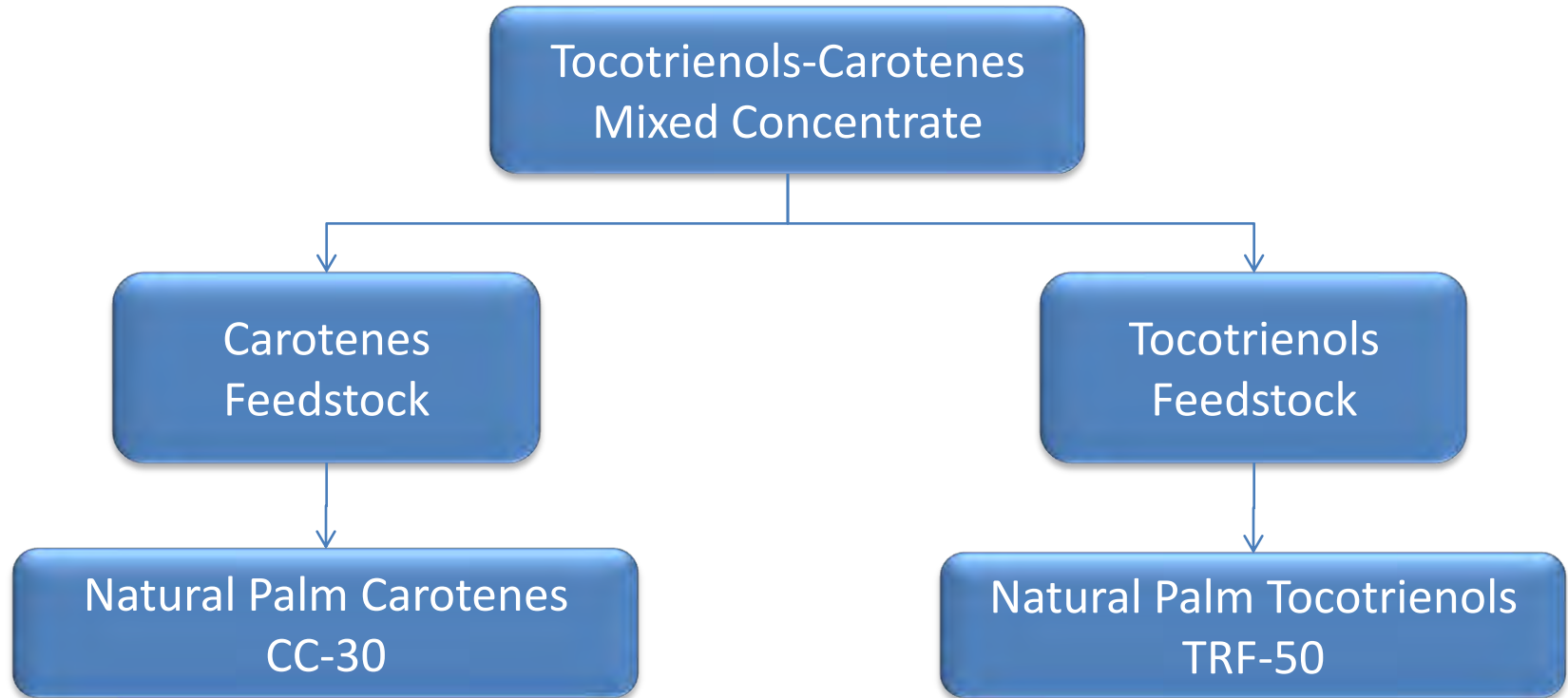
Composition of Vitamin E in Palm Fruit Oil



Nutraceuticals From Red Palm Oil



Natural Palm Carotenes & Tocotrienols



Vertical Integration A Key to Sustainability

- Fully vertically integrated supply chain from RSPO/SG certified plantation to nutraceuticals.
- 100% in-house quality control.
- Traceability throughout the supply chain.



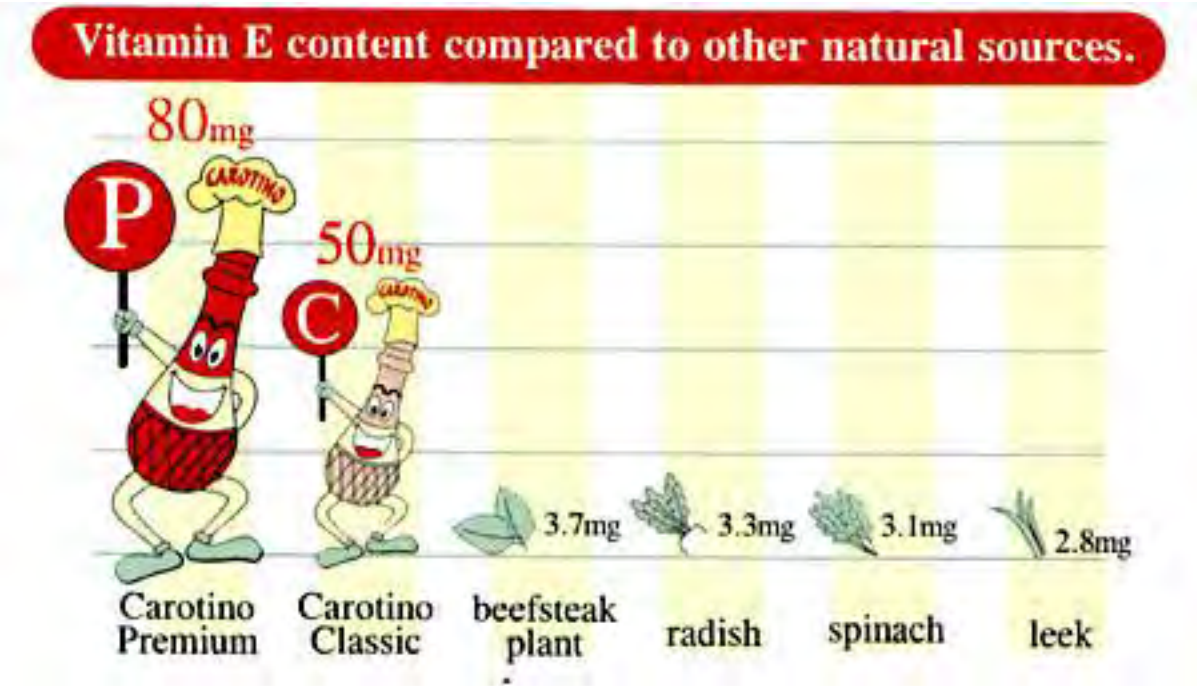
The Competitive Scenario

Comparison between Carotino and other vegetable oils.

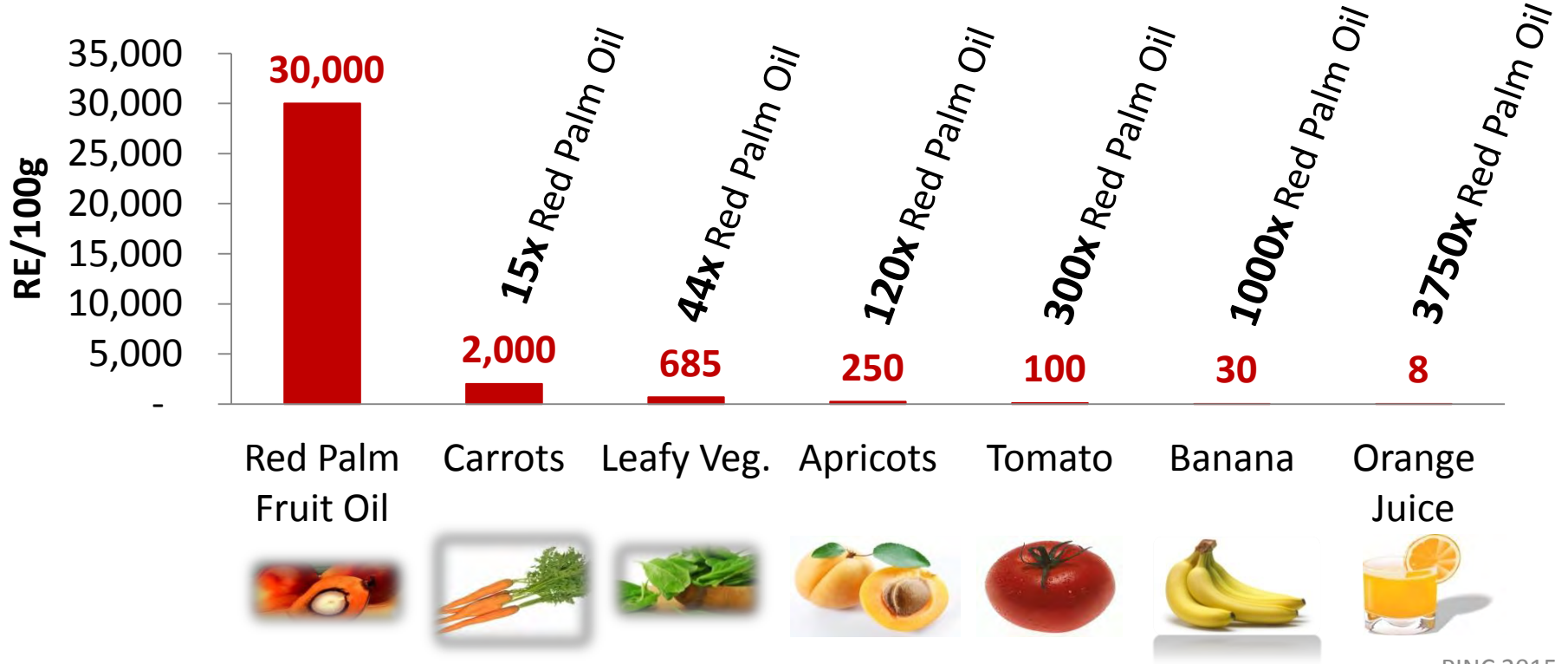
Vitamin E	80mg	50mg	39mg	27.4mg	20.7mg	7.6mg
Carotene	50mg	12.5mg	0mg	0mg	0mg	0mg



Natural Vitamin E in Red Palm Fruit Oil (Carotino)



RE of Red Palm Fruit Oil



Red Palm Oil – The Nutritional Advantage

- Improves nutritional value of end product – RDA Claims
- Boosts the nutritional content with natural carotenes, tocopherols , tocotrienols and co-enzyme Q10
- Efficacy of Red Palm Oil in the area of heart disease, cancer and vitamin A deficiency has been established through many health studies
 - (Refer to www.carotino.com /Research Studies for papers published)
- Gives natural golden yellow color to the food products
 - Eliminate or reduce use of synthetic colorants
 - Eliminate or reduce use of synthetic antioxidants.



Carotino Red Palm Fruit Oil Claims

- GMO free
- Trans-fatty acids free
- Sourced from sustainable plantations and certified RSPO SG
- No synthetic ingredients
- Produced in a facility conforming to ISO 9001:2008 and FSSC 22000:2013 standards
- Kosher and Halal
- Conforms to EU Regulations for:
 - Dioxins
 - Pesticides residue
 - Mycotoxins
 - Heavy metals
 - Microbes
 - PAH
- Low MCPD & Glycidol Ester



Natural Palm Carotenes – The Science Thus Far

- ❖ Inhibits certain types of cancer cells^{1,2}
- ❖ Strong anti-oxidant properties³
- ❖ Precursors of vitamin A⁷
- ❖ Essential for good vision⁵
- ❖ Important for healthy skin & hair, strong teeth & bones⁴
- ❖ Crucial for functioning immune system, cell development & reproductive system⁶

References

- ¹Kalanithi Nesaretnam, Eu Jin Lim, Karin Reimann, Leslie C. Lai: Effect of a carotene concentrate on the growth of human breast cancer cells and pS2 gene expression. *Toxicology*, Vol. 151(1-3); pp : 117-126, 2000
- ²Nishino H, Takayasu J, Iwashima A, Murakoshi M, Imanishi J : Anticarcinogenesis activity of natural carotenes. *C R Seances Soc Biol Fil 1989; 183(1):85-9.*
- ³Elena Serbinovaa; May Choo; Lester Packer: Distribution and antioxidant activity of a palm oil carotene fraction in rats. *Biochem Intl*, 28, 881-886, 1992
- ⁴Keita Someya, Yuka Totsuka, Michiaki Murakoshi, Hirokazu Kitano, Teruo Miyazawa: The Antioxidant Effect of Palm Fruit Carotene on Skin Lipid Peroxidation in Guinea Pigs as Estimated by Chemiluminescence-HPLC Method. *J Nutr Sci Vitaminol* 40: 315-324, 1994
- ⁵Parisi V, Tedeschi M, Galinaro G, Varano G, Varano M, Saviano S, Piermarocchi S: Carotenoids and Antioxidants in Age-Related Maculopathy Italian Study: Multifocal Electroretinogram Modifications after 1 Year. *Ophthalmology*, 115, 324-333, 2008
- ⁶Hughes, D: Effects of carotenoids on human immune function. *Proc. Nutr. Soc.* 58:713-718, 1999
- ⁷LM Canfield, RG Kaminsky, DL Taren, E Shaw and JK Sander: Red palm oil in the maternal diet increases provitamin A carotenoids in breastmilk and serum of the mother-infant dyad. *Eur J Nutr*, 40 (1): 30-8, 2001

Challenges in Marketing Red Palm Oil

- Red colour is *Alien*, lighter coloured oils are perceived to be better.
- Up against olive oil – thousands of years of history (dates back to 2500 BC).
- Needs a lot of nutritional and medical studies to prove efficacy.
- Negative image of palm oil as saturated and unhealthy.
- Pressure from environmental NGOs.
- Difficulty in penetrating global markets because of Asian origin.
- Tariff and non-tariff barriers.

Challenges in Marketing Palm Carotenoids

- Always compared to synthetic beta-carotene on price and performance.
- Competition from other sources of Carotenes;
 - eg. Algae, Annato, fungus etc.
- Negative perception due to palm origin, especially in the developed world.
- Lack of clinical trial evidence to prove efficacy.
- Spill over effects of negative results from smoker's study using synthetic beta-carotene.^{1,2}
- Stringent demands with regard to contents of residual solvents, dioxin, PAH, pesticide residue, microbial content, mycotoxins etc.

References

¹The Alpha-Tocopherol, Beta Carotene Cancer Prevention Study Group, Massachusetts Medical Society: The Effect of Vitamin E and Beta Carotene on the Incidence of Lung Cancer and Other Cancers in Male Smokers. The New England Journal of Medicine, Vol 330(15); pp1029-1035, 1994.

²Gary E. Goodman et. al.: The Beta-Carotene and Retinol Efficacy Trial: Incident of Lung Cancer and Cardiovascular Disease Mortality During 6-Year Follow-up After Stopping β -Carotene and Retinol Supplements. J Natl Cancer Inst.; Vol 96(23): pp1743-1750, 2004.

Opportunities

- ✓ Avenue to establish a niche market based on sound science.
- ✓ Capitalize on an excellent sustainability platform.
- ✓ Improve the image of palm oil in general by promoting the nutritional advantage of red palm oil and palm carotenes.
- ✓ Highlight the benefits of a natural bouquet of carotenoids.
- ✓ Differentiate using the synergistic effects of other minor constituents in red palm fruit oil.

The Way Forward

- Aggressively pursue the Differentiation Strategy.
- Accelerate human clinical trials to create compelling scientific evidence.
- Explore applications in personal care and industrial use instead of just focusing on food applications.
- Further strengthen the Sustainability Story.
- Use red palm oil and palm nutraceuticals as a vehicle to enhance the image of palm oil in general.
- Initiate G to G discussions to use red palm oil as a means of combating vitamin A deficiency in under developed world.

THANK YOU

www.carotino.com

